

# The Soils That We Classify

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## Introduction

Chapter 1 “The Soils That We Classify” in the 2<sup>nd</sup> edition of *Soil Taxonomy* defines the concepts: soil, pedon, and buried soils. These definitions are occasionally overlooked when describing and classifying soils. Before classifying a soil, one must first recognize the upper and lower limits of soil, the size of the pedon, and the presence or absence of a surface mantle.

## Soil

Soil is a natural body comprised of solids, liquid, and gases that occurs on the land surface, occupies space, and has *one or more* of the following:

1. Horizons or layers distinguishable from the parent material as a result of additions, losses, transfers, and transformations; or
2. The ability to support rooted plants in a natural environment.

**Upper limit:** Contact between soil and air, shallow water, live plants, or plant materials that have not begun to decompose.

**Lower limit:** 200 cm. (However, this does not mean that pedon descriptions must stop at 200 cm.)

**Figures 1 and 2:** The definition of soil includes areas permanently covered by water provided rooted plants grow.

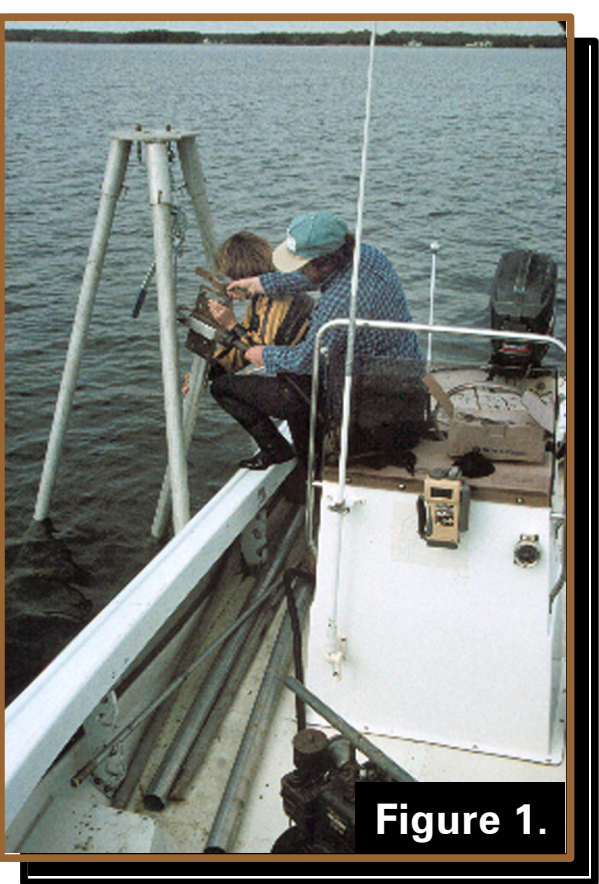


Figure 1.



Figure 2.

## Pedon

A pedon is the smallest volume of soil that can be used to describe and sample the soil to represent the landscape segment. The minimal horizontal area of a pedon is arbitrarily set at 1 m<sup>2</sup>, but it ranges to 10 m<sup>2</sup>, depending on the variability.

**Figures 3 and 4** illustrate the common situation. Some areas have soils that are continuous and of nearly uniform thicknesss and composition such as this landscape in Wyoming. The pedon in this area has a horizontal area of 1 m<sup>2</sup>.

When horizons are intermittent or cyclic and recur in linear intervals of 2 to 7 m, the pedon includes one-half the cycle. Thus, each pedon includes the range of variability that occurs within small areas.

**Figure 5** shows a pedon in the Yukon Territory that has an organic layer about 40 cm thick in the low-lying areas and about 20 cm thick in the areas of higher microrelief. This pattern is repeated at linear intervals of about 1 m. When the cycle is less than 2 m, the horizontal area of a pedon is the minimum size, 1 m<sup>2</sup>. Soil Taxonomy has taxa at the subgroup level to deal with the range in thickness of the organic layers.

**Figure 6** is an illustration of the cycle at 3 m. One-half the cycle is 1.5 m, and the horizontal area of the pedon is (1.5 m)<sup>2</sup> or 2.3 m<sup>2</sup>.



Figure 3.

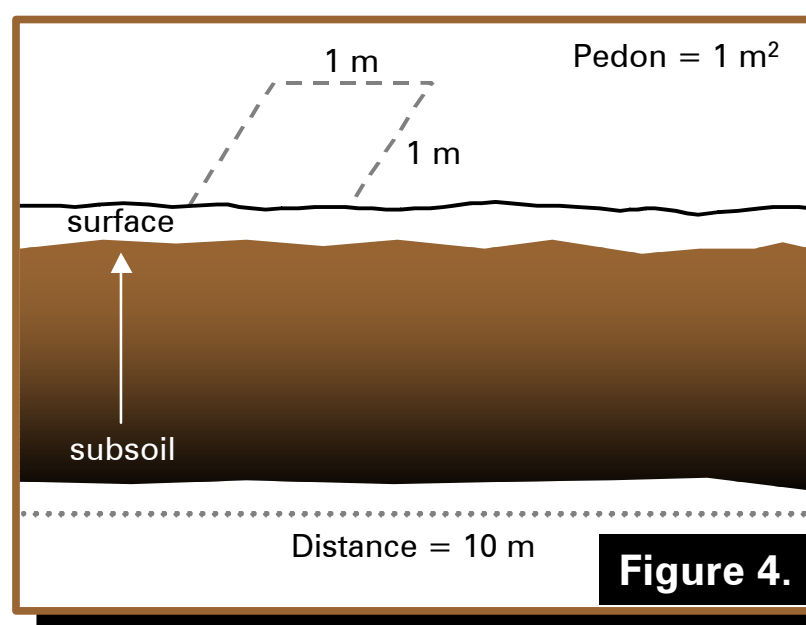


Figure 4.

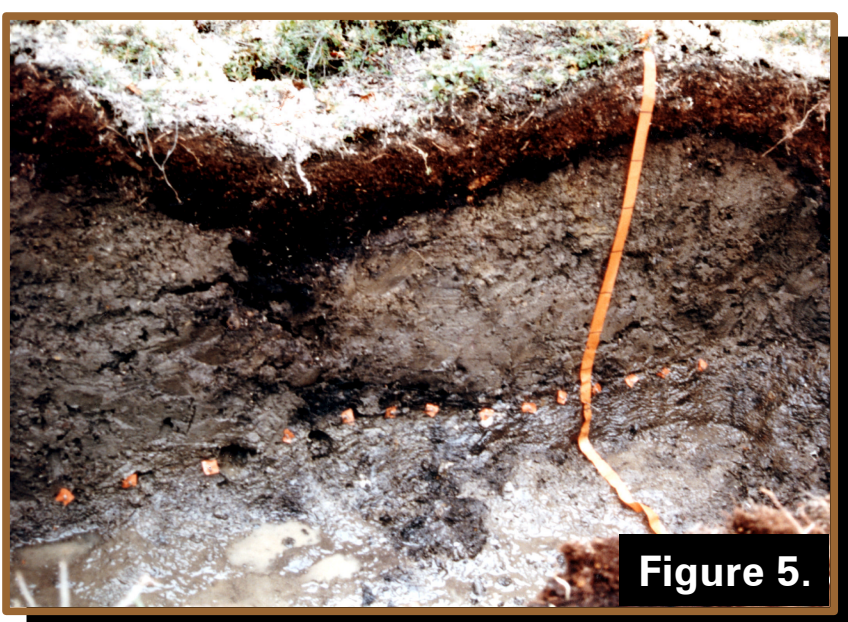


Figure 5.

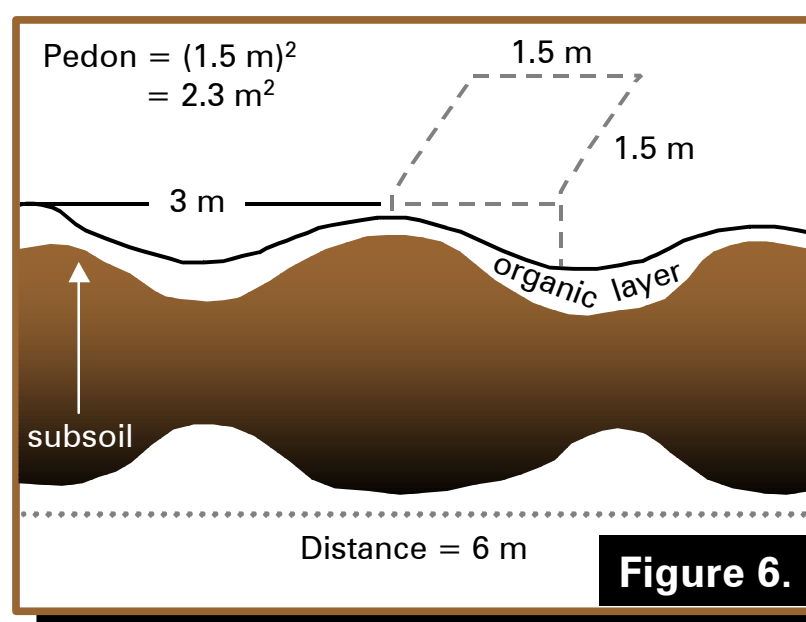


Figure 6.

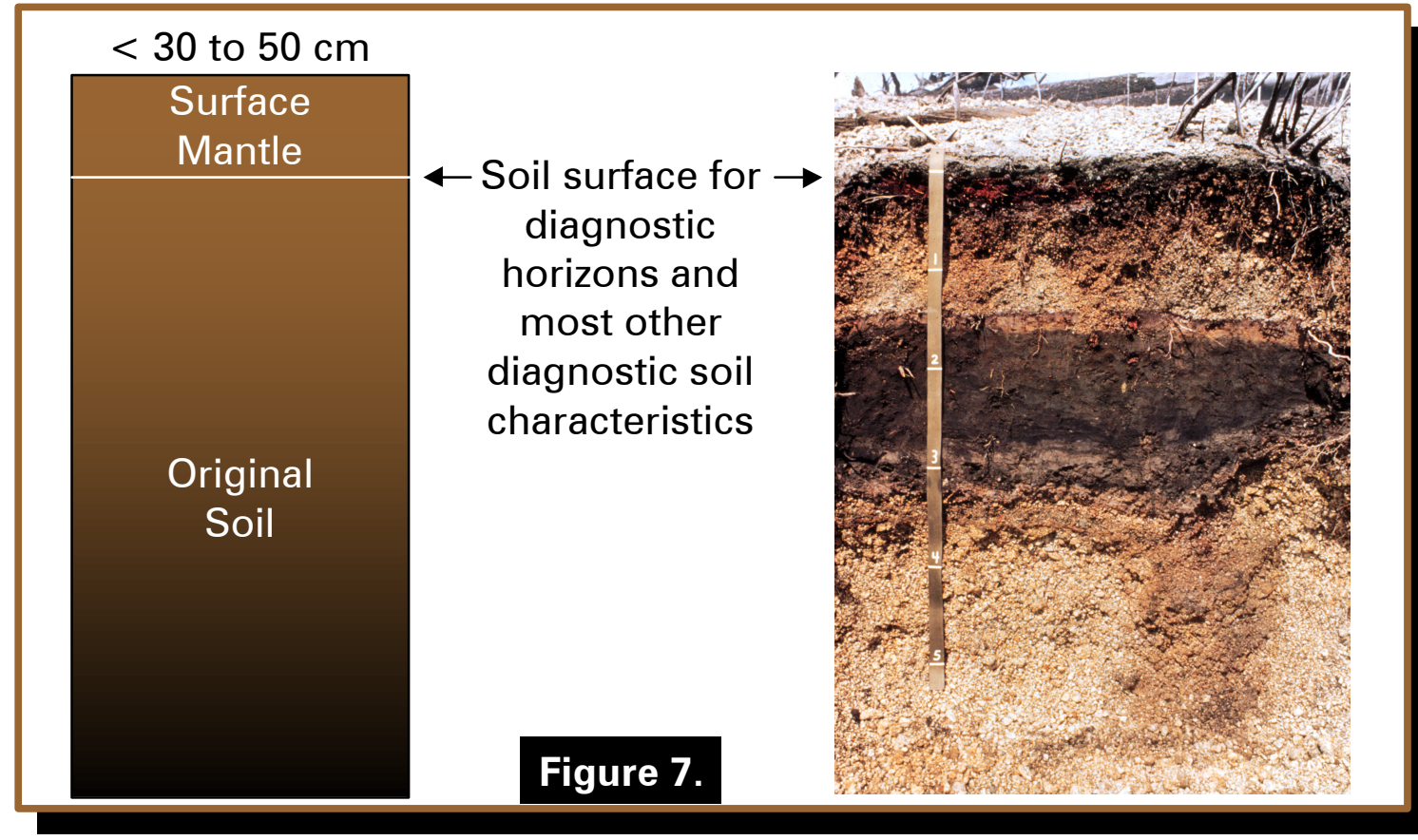


Figure 7.

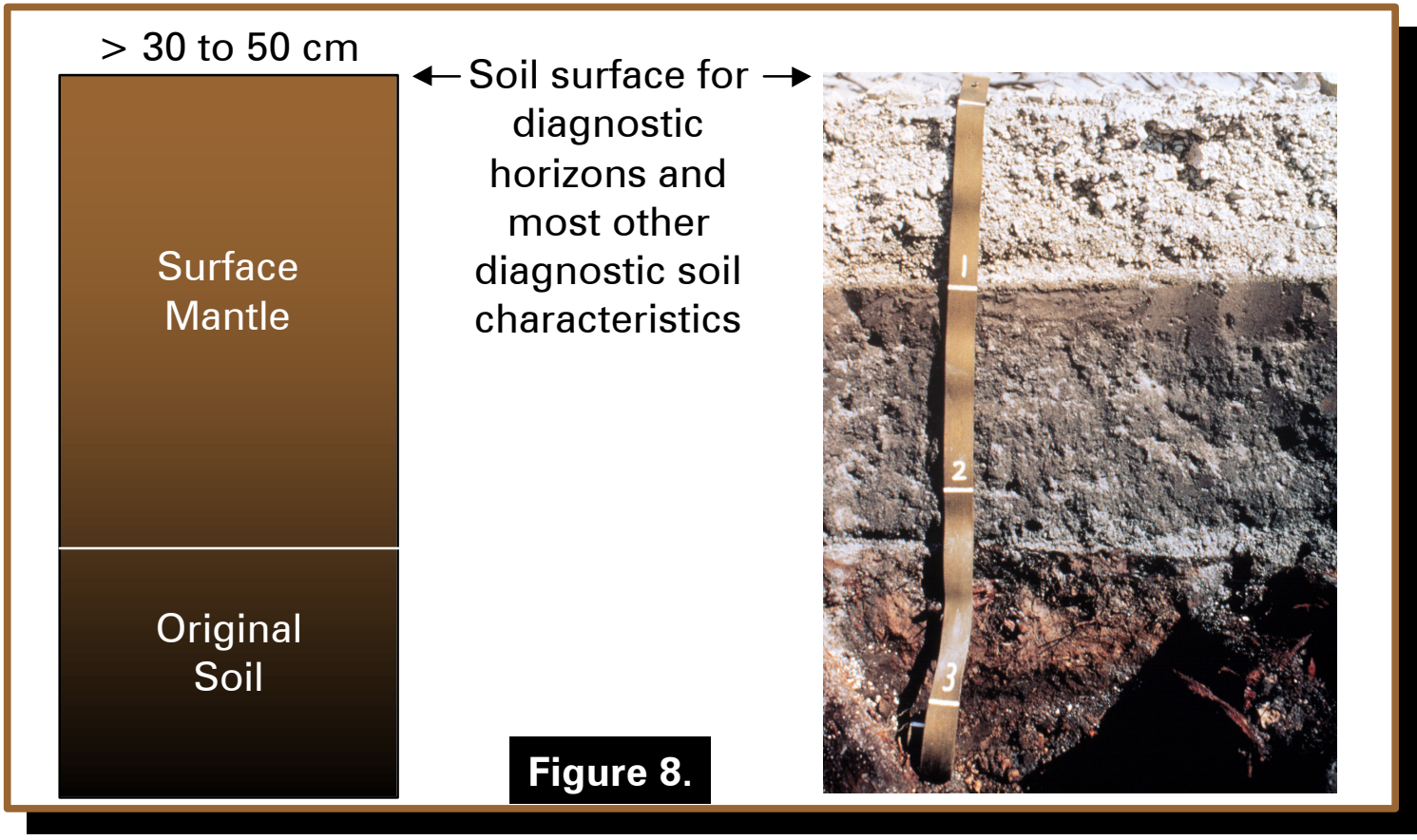


Figure 8.

## Buried Soils

The properties of buried soils and the properties of a surface mantle are considered based on whether or not the soil meets the meaning of the term “buried soil” given in Chapter 1.

A soil is defined as a buried soil if it is covered with a surface mantle of new soil material that is either 50 cm or more thick, or is 30 to 50 cm thick and has a thickness that equals at least half the total thickness of the named diagnostic horizons that are preserved in the buried soil.

A surface mantle of new material, as defined here, is largely unaltered, at least in the lower part. It may have a diagnostic surface horizon (epipedon) and/or a cambic horizon, but has no other diagnostic subsurface horizons, all defined in *Soil Taxonomy*. However, there remains a layer 7.5 cm or more thick that fails the requirements for all diagnostic horizons, as defined in *Soil Taxonomy*, overlying a horizon sequence that can be clearly identified as the solum of a buried soil in at least half of each pedon. The recognition of a surface mantle should not be based only on studies of associated soils.

If a soil has a surface mantle, and is not a buried soil, the top of the original surface layer is considered the “soil surface” for determining depth to and thickness of diagnostic horizons and most other diagnostic soil characteristics. The only properties of the surface mantle that are considered are soil temperature, soil moisture (including aqic conditions), and any andic or vitrandic properties.

If a soil profile includes a buried soil, the present soil surface is used to determine soil moisture and temperature, and depth to and thickness of diagnostic horizons and other diagnostic soil characteristics.

Diagnostic horizons of the buried soil are not considered in selecting taxa unless the criteria in the keys specifically indicate buried horizons, such as in Thapto-histic subgroups. Most other diagnostic soil characteristics of the buried soil are not considered, however organic carbon if Holocene age, andic soil properties, base saturation, and all properties used to determine family and series placement are considered.

**Figure 7** shows a profile of the Sinnice series, a Thaptic Vitricryand forming in a thin layer of dacitic pumice and volcanic ash, deposited in 1980, over horizons formed in older pumice and volcanic ash. No horizons have formed in the upper material; therefore, the soil we classify starts below the layer of pumice and ash deposited in 1980.

**Figure 8** shows a profile of the Elkprairie series, a Vitrandic Cryorthent, forming in layers of volcanic ash and pumice deposited in 1980 over older weathered volcanic ash and pumice. A surface mantle buries the original soil more than 50 cm thick. The soil we classify starts at the soil surface and diagnostic horizons below the mantle are not considered in the classification.

## Summary

Before describing and classifying soils, one must consider the definition of soil and the concepts of the pedon, the surface mantle, and buried soils.

## Acknowledgements

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